

WE CLAIM:

1. A battery separator comprising:  
a microporous membrane; and  
a coating on at least one surface of said membrane,  
wherein said coating comprising a mixture of 25-40 weight % polymer  
and 60-75 weight % surfactant combination, wherein said polymer  
being cellulose acetate, and said surfactant combination comprising  
a first surfactant and a second surfactant, said first surfactant  
having an active ingredient selected from the group consisting of  
organic ethers, said second surfactant being an oxirane polymer  
with 2-ethylhexyl dihydrogen phosphate.
2. The separator according to Claim 1, wherein said first  
surfactant and said second surfactant having a 1:1 weight ratio.
3. The separator according to Claim 1, wherein said first  
surfactant and said second surfactant having a 1:3 weight ratio.
4. The separator according to Claim 1, wherein said first  
surfactant and said second surfactant having a 3:1 weight ratio.
5. The separator according to Claim 1, wherein said  
cellulose acetate having about 2.5 acetyl groups per glucose.

6. The separator according to Claim 1, wherein said coating being on both surfaces of said membrane.

7. The separator according to Claim 6, wherein said coating having a surface density in the range of 0.30 to 0.43 mg/cm<sup>2</sup>.

8. The separator according to Claim 6, wherein said coating having a surface density in the range of 0.31 to 0.38 mg/cm<sup>2</sup>.

9. The separator according to Claim 6, wherein said separator being stored for a period not less than 22 days and not exceeding 256 days at 70°C, and said separator having an electrical resistance of  $\leq 10$  milliohms-inch<sup>2</sup>.

10. The separator according to Claim 6, wherein said separator being stored for a period not less than 22 days and not exceeding 256 days at 70°C, and said separator having an electrical resistance in the range of 7.7 to 10 milliohms-inch<sup>2</sup>.

11. The separator according to Claim 6, wherein said separator being adapted for wetting by an aqueous electrolyte.

12. The separator according to Claim 11, wherein said separator being freshly coated, and said separator being wetted within 8 seconds or less.

13. The separator according to Claim 11, wherein said separator being stored for a period not less than 22 days and not exceeding 256 days at 70°C, and said separator being wetted within 1 second or less.

14. The separator according to Claim 11, wherein said separator being stored for a period not less than 22 days and not exceeding 256 days at 70°C, and said separator being wetted instantaneously.

15. The separator according to 6, wherein said membrane having a thickness of less than 1.5 mils.

16. The separator according to Claim 6, said separator having an effective average pore size of less than 0.045 micron.

17. A battery having a zinc electrode comprising:  
a first electrode;  
a second electrode;  
an electrolyte; and

a separator, said separator being disposed between said first electrode and said second electrode and said electrolyte being in communications with said electrodes via said separator;

wherein said separator comprises;

a microporous membrane; and

a coating on at least one surface of said membrane, wherein said coating comprising a mixture of 25-40 weight % polymer and 60-75 weight % surfactant combination, wherein said polymer being cellulose acetate, and said surfactant combination comprising a first surfactant and a second surfactant, said first surfactant having an active ingredient selected from the group consisting of organic ethers, said second surfactant being an oxirane polymer with 2-ethylhexyl dihydrogen phosphate.

18. The battery according to Claim 17, wherein said first surfactant and said second surfactant having a 1:1 weight ratio.

19. The battery according to Claim 17, wherein said first surfactant and said second surfactant having a 1:3 weight ratio.

20. The separator according to Claim 17, wherein said first surfactant and said second surfactant having a 3:1 weight ratio.

21. The battery according to Claim 17, wherein said cellulose acetate having about 2.5 acetyl groups per glucose.

22. The battery according to Claim 17, wherein said coating being on both surfaces of said membrane.

23. The battery according to Claim 22, wherein said coating having a surface density in the range of 0.30 to 0.43 mg/cm<sup>2</sup>.

24. The battery according to Claim 22, wherein said coating having a surface density in the range of 0.31 to 0.38 mg/cm<sup>2</sup>.

25. The battery according to Claim 22, wherein said separator being stored for a period not less than 22 days and not exceeding 256 days at 70°C, and said separator having an electrical resistance of  $\leq 10$  milliohms-inch<sup>2</sup>.

26. The battery according to Claim 22, wherein said separator being stored for a period not less than 22 days and not exceeding 256 days at 70°C, and said separator having an electrical resistance in a range of 7.7 to 10 milliohms-inch<sup>2</sup>.

27. The battery according to Claim 22, wherein said separator being adapted for wetting by an aqueous electrolyte.

28. The battery according to Claim 27, wherein said separator being freshly coated, and said separator being wetted within 8 seconds or less.

29. The battery according to Claim 27, wherein said separator being stored for a period not less than 22 days and not exceeding 256 days at 70°C, and said separator being wetted within 1 second or less.

30. The battery according to Claim 27, wherein said separator being stored for a period not less than 22 days and not exceeding 256 days at 70°C, and said separator being wetted instantaneously.

31. The battery according to Claim 22, wherein said membrane having a thickness of less than 1.5 mils.

32. The battery according to Claim 22, said separator having an effective average pore size of less than 0.045 micron.